



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/030,972	01/15/2002	Andreas Peter Abel	2001_1861A	4434
513	7590	12/29/2005	EXAMINER	
WENDEROTH, LIND & PONACK, L.L.P.			YU, MELANIE J	
2033 K STREET N. W.			ART UNIT	
SUITE 800			PAPER NUMBER	
WASHINGTON, DC 20006-1021			1641	
DATE MAILED: 12/29/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/030,972

Applicant(s)

ABEL ET AL.

Examiner

Melanie Yu

Art Unit

1641

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-63 and 81-92 is/are pending in the application.
- 4a) Of the above claim(s) 48-63 and 92 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-47 and 81-91 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. Applicant's amendment and arguments filed 11 October 2005 has been entered. Claims 1-47 and 81-91 are currently amended. Claims 48-63 and 92 are withdrawn. Claims 64-80 have been cancelled. Claims 1-63 and 81-92 are currently pending in this application.

Withdrawn Rejections

2. Previous rejections under 35 USC 112, second paragraph have been withdrawn.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-47 and 81-91 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The original specification fails to teach a sealing layer having a plurality of recesses opening at least towards the sensor platform. It is noted that the specification teaches the device comprising a plurality of recesses opening at least towards the sensor platform at page 9, lines 27-36, but fail to specify the sealing layer comprising the plurality of recesses. The original specification also fails teach sample compartments adapted such that sample solutions or reagent solutions received therein are removable therefrom. It is noted the original specification teaches sample compartments operable to be cleared from received sample or reagent solutions

Art Unit: 1641

and to receive. However, adequate teaching of adaptation of a sample compartments is not provided.

Claim 34 recites the incoupling and outcoupling grating structures extend over at least a portion of the sample compartments. The original specification fails to teach the grating structures extending over “at least a portion” of the sample compartments. It is noted the original specification teaches the grating structures extending over the range of multiple sample compartments at page 16, but fail to provide for at least a portion of the sample compartments.

3. Claims 1-47 and 81-91 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites a sealing layer comprising recesses opening at least toward the sensor platform and sample compartments adapted such that sample or reagent solutions received therein are removable therefrom. It is unclear whether the sealing layer having a plurality of recesses opening at least toward the sensor platform are the same adaptations for the supply and removal of sample or reagent solutions. Claim 45 further recites sample compartments having openings for the locally addressed supply or removal of samples or other reagents at a side facing away from the sensor platform. It is unclear whether the openings of the sample compartments are the same openings in the sealing layer. It is further vague and confusing as to whether the sealing layer is considered part of the sample compartment and provides openings to the sample compartment. If the sealing layer is not part of the sample compartment, it is confusing as to how each of the recesses having an opening would open toward a corresponding sample compartment.

Claim 5 recites a waveguide comprising a material that is optically transparent to at least an excitation wavelength, in line 5 of the claim. It is unclear whether the recited excitation wavelength is the same wavelength recited in 14 of claim 1.

Claim Rejections - 35 USC § 102

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-34, 38-40, 42-47, 81-84 and 86-91 are rejected under 35 U.S.C. 102(b) as being anticipated by Neuschäfer et al. (WO 96/35940).

Neuschäfer et al. teach a device comprising: a sensor platform having a planar optical waveguide (pg. 13, last paragraph-pg. 14, line 4), and a sealing layer forming a tight seal with a sealing medium with the planar optical waveguide (a cover is part of a sealing layer that is glued to the sensor platform to form a unit, pg. 29, lines 1-17; pg. 13, last paragraph-pg. 14, line 5), the sealing layer having a plurality of recesses opening at least towards the sensor platform (a cover which is part of the sealing layer has recesses, central cut out portions, comprising inlet and outlet openings for solutions, pg. 14, lines 6-12), each of the recesses forming a corresponding sample compartment in a 2-dimensional arrangement (central cut out portions form a flowthrough cell, which is the sample compartment, the sample compartments are formed in a 2-dimensional arrangement, pg. 14, lines 6-12, 7, Fig. 5b), wherein each of the sample compartments comprise different biological recognition elements, for specific recognition and binding of different analyte (pg. 14, lines 11-12; pg. 21, lines 19-24) and are immobilized in 5 to 50 discrete measurement areas, which encompasses the recited five or more, in a two-dimensional array on the planar optical waveguide (number of individual waveguiding regions,

Art Unit: 1641

pg. 13, lines 7-8; recognition elements immobilized on waveguiding regions, pg. 14, lines 11-12; detection regions, pg. 13, lines 21-22), the measurement areas are in optical interaction with an excitation light emanating from the optical waveguide as part of the sensor platform which forms a demarcation of the sample compartments (pg. 7, lines 18-19; pg. 8, lines 22-24; pg. 17, lines 5-6), wherein the sample compartments are adapted such that samples received therein are removable therefrom and further sample solutions are receivable therein (outlet indicates that samples are removable and further samples are receivable, pg. 14, lines 8-10).

Regarding claims 2 and 3, Neuschäfer et al. teach one measurement area in each of the sample compartments used for referencing (quality control, pg. 36, lines 23-24). Neuschäfer et al. also teach the referencing measurement areas reference same chemical parameters in a number of sample compartments distributed over the sensor platform (same control molecules, used for referencing, are immobilized in strips on five regions, pg. 36, lines 25-26). Neuschäfer et al. do not specifically teach lateral distribution of the chemical parameters over the sensor platform. However, such a limitation is drawn to intended use of referencing measurement areas and do not require any further product limitations. Therefore, since the device of Neuschäfer et al. comprise the limitations recited in claims 1 and 2, the device of Neuschäfer et al. would be capable of providing such determination of chemical parameters.

With respect to claim 4, Neuschäfer et al. teach measurement areas in optical interaction with an evanescent field of the excitation light guided in the planar optical waveguide (pg. 6, last line-pg. 7, line 3).

Regarding claims 5 and 6, Neuschäfer et al. teach the planar optical waveguide being self-supporting (pg. 5, lines 24-29) and part of the sensor platform being a multi-mode or single-

mode waveguide comprising glass (pg. 15, line 10), which is optically transparent at the excitation wavelength (pg. 15, lines 13-14).

With respect to claims 7-13, Neuschäfer et al. teach the planar optical film waveguide comprising a first optically transparent layer, a waveguiding layer, on a second optically transparent layer, made of glass, wherein the second optically transparent layer has a lower refractive index than the first layer (pg. 10, lines 12-17; pg. 15, lines 19-22) and wherein the refractive index of the first optically transparent layer is higher than 2.0 (pg. 16, lines 2-3), which encompasses the recited greater than 1.8, and is made of TiO_2 (pg. 15, lines 4-5). Neuschäfer et al. also teach the thickness of the first optically transparent layer between 40 and 1000 nm (pg. 15, lines 7-8), which encompasses the recited between 40 and 300 nm. Neuschäfer et al. also teach an additional optically transparent layer located between the first and second optically transparent layers, and in contact with the first optically transparent layer (substrate is covered with thin layer, which indicates contact, pg. 15, lines 18-20), and having a thickness of less than 10,000 nm (pg. 15, lines 17-18), which encompasses the recited range of 5-10,000 nm, wherein the purpose of the additional layer is to reduce the surface roughness below the first optically transparent layer (pg. 15, lines 18-22).

Regarding claims 14-16, Neuschäfer et al. teach an the device further comprising an adhesion-promoting layer deposited on the first optically transparent layer for the immobilizing biological recognition elements (pg. 19, lines 14-16), having a thickness of less than 50 nm (pg. 19, lines 17-18), which is encompassed by the recited less than 200 nm, and a comprising chemical compounds of silanes (pg. 12, lines 15-20).

With respect to claims 17-18 and 81, Neuschäfer et al. teach measurement areas generated by deposition of biological elements on the sensor platform (Fig. 3-5; pg. 13, last paragraph-pg. 14, line 2; pg. 18, lines 12-13). Although Neuschäfer et al. do not specifically teach the areas generated by deposition of biological recognition elements, such a limitation does not appear to physically further limit the product recited in claims 1 and 17. It is unclear what product limitations are set forth by areas generated by laterally selective deposition, and since the same product limitations are taught by Neuschäfer et al. as recited in claims 1 and 17, the product of Neuschäfer et al. would be capable of comprising measurement areas generated by deposition of biological elements. Neuschäfer et al. teach a method of deposition comprising ink jet spotting (pg. 18, lines 15-21).

Regarding claims 19 and 20, Neuschäfer et al. teach a biological recognition element being nucleic acids (pg. 21, lines 19-24), including DNA which comes from a cell and is considered a cell fragment.

With respect to claims 21-22, Neuschäfer et al. teach “chemically neutral” compounds such as bovine serum albumin, to minimize nonspecific binding (pg. 37, lines 23-29; pg. 40, lines).

Regarding claims 23-26, Neuschäfer et al. teach the first optically transparent layer having at least one grating structure formed therein for incoupling excitation light to the measurement areas (pg. 16, lines 22-25), and the first optically transparent layer having at least one grating structure formed therein for outcoupling of light into the first optically transparent layer (pg. 17, lines 5-13). Neuschäfer et al. also teach the incoupling and out coupling grating structures interchangeable with respect to incoupling and outcoupling (pg. 17, lines 6-7).

With respect to claims 27-29, Neuschäfer et al. teach grating structures having a period of 200 nm – 1000 nm and a grating modulation depth of 3-100 nm (pg. 16, last paragraph), wherein the ratio of the grating modulation depth to thickness of the first optically transparent layer is equal to or smaller than 0.2 (pg. 16, lines 11-12). Neuschäfer et al. further teach grating structures being rectangular with a periodic modulation of the refractive index in the planar optically transparent layer (rectangular, pg. 16, lines 16-17).

Regarding claim 30, Neuschäfer et al. teach a thin metal layer, gold, deposited between the first optically transparent layer and the immobilized biological recognition elements, wherein the thickness of the metal can be excited at a luminescence wavelength (pg. 11, lines 11-15).

With respect to claims 31-34, Neuschäfer et al. teach a grating structure having a diffractive grating with a uniform period (pg. 16, last paragraph) or a multi-diffractive grating (1-3 modes is a multi-diffractive grating, pg. 18, lines 1-2). Neuschäfer et al. further teach the incoupling and outcoupling grating structures located outside a region of the sample compartments (grating located in and out of sample compartment, 3,3', Fig. 6; pg. 9, lines 23-24) and grating structures extend over at least a portion of the sample compartments (one periodicity indicates one grating structure over all sample compartments; pg. 16, last paragraph).

Regarding claims 38, 39, 82 and 83, Neuschäfer et al. teach a sealing material, comprising polysiloxane (pg. 12, lines 15-20), and is self-adhesive (pg. 34, lines 4-7).

With respect to claims 40, 42, 84 and 86, Neuschäfer et al. teach 2-100 measurement areas in one sample compartment (pg. 13, lines 22-23), which is encompassed by the recited 2-1000 measurement areas. Neuschäfer et al. also teach the sample compartments having a volume of 0.07 ml (pg. 34, line 5), which is encompassed by the recited 100 nl-1ml.

Regarding claims 43 and 87, Neuschäfer et al. the device comprising sample compartments closed at a side facing away from the sensor platform except for inlet and outlet openings for supply and removal of samples (Fig. 5b; pg. 14, lines 6-12). Neuschäfer et al. fail to teach supply or removal of samples performed in a closed flow-through system, wherein common inlet and outlet openings are addressed row by row or column by column. However, such limitations do not appear to further limit the product limitations recited in claims 1, 43 and 87. Therefore, since Neuschäfer et al. teach the product limitations recited in claims 1, 43 and 87, the device of Neuschäfer et al. would be capable of performing such supply or removal of samples.

With respect to claims 44 and 88, Neuschäfer et al. fail to teach supply of samples affected by pressure differences or electric potentials. However, such a limitation does not appear to provide further product limitations to the product of claims 1 and 44. Therefore since Neuschäfer et al. teach the recited product limitations of claims 1 and 44, the device of Neuschäfer et al. would be capable of affecting the sample supply with the recited pressure differences or electric potentials.

Regarding claims 45-47 and 89-91, Neuschäfer et al. teach sample compartments having openings for locally addressed supply or removal of samples or other reagents at the side facing away from the sensor platform (inlet and outlet openings for solutions, pg. 14, lines 6-12). Neuschäfer et al. further teach compartments provided for reagents (reagents are contained in a compartment when introduced into the flow-through device, pg. 36, lines 8-10). Neuschäfer et al. also teach mechanically recognizable marks are provided on the sensor platform, in order to

Art Unit: 1641

facilitate the adjustment in an optical system (depression cut for waveguide so waveguiding layer faces the cannels and facilitates optical detection, pg. 37, lines 7-13).

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 35-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Neuschäfer et al., as applied to claim 1, in view of Hashimoto et al. (US 6,480,639).

Neuschäfer et al., as applied to claim 23, teach a device comprising a tight sealing layer, but fail to teach the material being optically transparent or optically absorbent.

Hashimoto et al. teach a sealing layer being optically transparent or absorbent (col. 16, lines 54-63), in order to block leakage lights from the light emitting device.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to include in the device of Neuschäfer et al., an absorbent or transparent sealing layer as taught by Hashimoto et al., in order to more effectively seal the optical device and fix optical fibers..

Hashimoto et al. also teach a 2 layer system wherein a first layer that is transparent to excitation radiation is brought into contact with a sensor platform (col. 16, line 54-57), and a second layer absorbent in a spectral range of the excitation radiation is present and located remotely from the sensor platform (col. 16, lines 58-63).

5. Claims 41 and 85 are rejected under 35 U.S.C. 103(a) as being unpatentable over Neuschäfer et al. (WO 96/35940).

Neuschäfer et al., as applied to claim 1, teach a device comprising a sample compartment occupying an area of 9 mm^2 (pg. 36, last 2 lines). Neuschäfer et al. fail to teach an area of $0.001\text{--}6 \text{ mm}^2$. However, it has long been settled to be no more than routine experimentation for one of ordinary skill in the art to discover an optimum value for a result effective variable. “[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum of workable ranges by routine experimentation” Application of Aller, 220 F.2d 454, 456, 105 USPQ 233, 235-236 (C.C.P.A. 1955). “No invention is involved in discovering optimum ranges of a process by routine experimentation.” Id. at 458, 105 USPQ at 236-237. The “discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art.” Since applicant has not disclosed that the specific limitations recited in instant claims 41 and 85 are for any particular purpose or solve any stated problem, and the prior art teaches that the measurement area can be varied in order to accommodate different sample volumes, absent unexpected results, it would have been obvious for one of ordinary skill to discover the optimum workable ranges of the methods disclosed by the prior art by normal optimization procedures known in the flow-through device art.

Response to Arguments

6. Previous rejections under 35 USC 112, second paragraph have been withdrawn due to applicant's amendments.
7. Applicant's arguments filed 11 October 2005 have been fully considered but they are not persuasive. Applicant argues that Neuschäfer et al. fail to disclose or suggest a 2-dimensional array of measurement areas in each sample compartment. Applicant argues that the strip-like waveguiding regions defined by the divisions can, at best, correspond to a 1-dimensional array.

Art Unit: 1641

However, the strips of Neuschäfer et al. are interpreted as a two-dimensional array. Each strip of Neuschäfer et al. has a length as shown in Figure 5a, reference numeral 2, and the combination of the strips together provides a width dimension. Therefore the array of Neuschäfer et al. is a two-dimensional array. Furthermore, the instant specification as originally filed fails to provide a definition or figure sufficiently defining applicant's definition of a two-dimensional array.

Conclusion

No claims are allowed.

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melanie Yu whose telephone number is (571) 272-2933. The examiner can normally be reached on M-F 8:30-5.

Art Unit: 1641

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on (571) 272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Melanie Yu
Patent Examiner
Art Unit 1641



LONG V. LE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1600

12/20/05